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(Technical Paper)

Hybrid Development of Smart Transportation: Through the Lens of the Triple Helix

Model of Innovation

(STS Paper)

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction: Hybridized of the development of Smart Transportation by government, universities, and industry

As new technologies and capabilities emerge, they will percolate into all facets of life. To build a Smart City of the future, Smart Transportation is a necessity. Smart Transportation has a very nebulous meaning, but at its core it involves using modern technology to empower a city's residents to participate in their communities through multi-modal access to transportation. Executing this vision is difficult for a variety of reasons which will be explored herein. The smart transportation industry is growing, and the research question I hope to explore is twofold. First, what is driving the growth of the intelligent transportation system industry? And second, how can the triple helix model of innovation be applied to understand the hybrid development of smart transportation by universities, industry, and government?

Literature Review

Building an intelligent transportation system is expensive. Without public support, it can be difficult to justify spending millions of taxpayer dollars on modernizing a transportation system. But according to the American Public Transportation Association, “Every \$10 million in capital investment in public transportation yields \$30 million in increased business sales” and “Every \$1 invested in public transportation generates \$4 in economic returns.” Studies show that investing in public transportation makes fiscal sense (Public Transportation Benefits, 2019). The issue then comes from a lack of public understanding. Without public support for better, more intelligent public transportation, city governments will not spend the money to implement them. What’s more, to make up for a lack of smart transportation, more individuals rely on cars to travel. This reduces their interest in achieving better public transportation as they already have a viable way to get to work. So in order to best implement smart transportation, a city government must either educate the public about the benefits of said transportation, or implement the changes without public support and potentially face backlash for wonton spending. This is a major obstacle to any city looking to create an intelligent transportation system.

Many proprietary technologies and competing companies provide services necessary for intelligent transportation systems. The market for intelligent transportation systems is projected to grow to from 21.77 billion to 29.16 billion dollars by 2024 (Global Intelligent Transport Systems... 2019). It is an expanding market, which means companies are competing for contracts. They are creating proprietary tools and applications. This results in a more difficult and expensive process of choosing a vendor, and cities risk being locked-in with their chosen vendors. In addition, ridesharing and micro-mobility platforms like Uber, Lyft, Lime and Byrd all have individual apps. A city wishing to create a single-source-of-truth application with all transportation modes in it cannot include these, because of the company’s intellectual property. While competition is ultimately good for the consuming cities, in the smart transportation industry’s nascent stages it will make it difficult for cities to realize the full potential of intelligent mobility (Glancy, D. J., 2016).

Smart cities as a whole are being jointly developed by private companies, governments, and universities in varying capacities. There is significant interaction between the three. Many consulting companies have entered the smart city industry, forming public-private partnerships with governments. Deloitte published a report with a list of ways to build productive public-

private partnerships (citation needed). Essentially, it is a starter guide for local governments to “attract” private partners to satisfy their smart city needs. The private companies which are enabling governments to achieve their goals are in turn enabled by a steady stream of new ideas from universities. Research done by universities provides both the private and public sector with better tools to build smarter cities. But most importantly, the knowledge and ideas graduating students bring into both the public and private sector drives innovation (add citation). These interactions are well documented, and indicate a synergistic development of smart transportation.

Framework

Universities are in a very unique position when considering emerging technologies. Universities interact with industry in two essential ways. They transfer knowledge through students graduating and entering industry, and through the faculty research being utilized in industry. Universities interact with government through policy decisions and public funding. Finally, government interacts with industry via regulation and policy. These interactions can lead to a hybridization of the three stakeholders, notably resulting in public-private partnerships and integration of industry and government interests into universities. This is called the triple helix model of innovation, and is used as a lens to better understand how these interactions affect science, technology, and society.

Methods

There are many potential sources of information on this topic. There are three essential sources of information according to the triple helix model of innovation, each requiring a different method of collecting said information. For universities, publicly funded research is a good source of the government-university interaction. Likewise, research done in conjunction with industry is a good reflection of the industry-university interaction. Next, case studies of public-private partnerships by Intelligent Transportation System consultants will be an excellent dissection of how industry and government are operating. Finally, interviewing industry members, researchers and government officials may be a useful tactic to gain access to more information if necessary. Then, having a good grasp of the hybridization of the three members of the triple helix, I hope to better understand the driving force of the growth of the intelligent transportation industry.

Discussion and Next Steps

Building a Smart Transportation system is possible, and has been done in many cities. Although, there are significant obstacles that cities must navigate to achieve their transit goals (Ge, Y. M., et al. 2017). These obstacles need to be overcome for an optimal implementation for any given city. As this industry and these emerging technologies continue to grow and compete, these obstacles may be dissolved. For my thesis, I will dive deeper into the process a city must undergo to build an intelligent transportation system so that I can better understand what drives the process, and the triple helix model of innovation can be used to describe the hybridization between smart transportation industry leaders, universities and government.

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